Patent Claims

1. A simulation method for determining nonlinear signal distortion in an analog circuit (7), which is to be tested, for processing discrete multitone signals (DMT), with the simulation method having the following steps:
(a) application of a discrete multitone signal, which has a large number of uniformly spaced carrier frequencies for data transmission in a predetermined frequency range, to the analog circuit (7), which is to be tested, and to a digital filter (18);
(b) suppression of the output signal from the analog circuit (7), which is to be tested, from the output signal from the digital filter (18) in order to produce a difference signal,
(c) adjustment of the digital filter (18) until the difference signal is a minimum, with the adjusted digital filter (18) forming an equivalent circuit of the analog circuit (7);
(d) application of the discrete multitone signal to the adjusted digital filter (18), with at least one carrier frequency being suppressed, for measuring the intermodulation product (D) of the adjusted digital filter (18).

2. The simulation method as claimed in claim 1, wherein
a multitone signal ratio is calculated from the measured intermodulation product.

3. The simulation method as claimed in claim 1 or 2, wherein
the adjustable modeling filter (18) is a discrete-time Volterra filter, or a neural network.

4. The simulation method as claimed in one of the

preceding claims,

wherein

the adjustable modeling filter (18) is connected in parallel with the analog circuit (7) which is to be tested.

5. The simulation method as claimed in one of the preceding claims,

wherein

the adjusted modeling filter (18), which forms an equivalent circuit of an analog circuit (7), is connected to further adjusted modeling filters, which form equivalent circuits of further analog circuits, in order to generate an overall equivalent circuit for an analog overall circuit.

6. The simulation method as claimed in one of the preceding claims,

wherein

the analog overall circuit is a DSL-SLIC circuit.

7. The simulation method as claimed in one of the preceding claims,

wherein

the discrete multitone signals are generated in a signal generator (1).

8. A test arrangement for determining nonlinear signal distortion of analog circuit elements of a signal processing circuit for signal processing of DMT signals having:

(a) a signal generator (1) for producing a discrete multitone signal;

(b) adjustable modeling filters (18) which are each connected in parallel with an associated analog circuit element (7), with the signal inputs of the modeling filters (18) and of the analog circuit elements (7) being connected to the signal generator (1);

(c) subtraction circuits, which each subtract the output signal from a modeling filter (18) from the output signal from the associated analog circuit element (7) in order to form a difference signal;

5   (d) an adjustment circuit, which compares the difference signals with a nominal value and adjusts the modeling filters (18) until the difference signals match the nominal value; and having

10   (e) a measurement circuit, which is connected to the outputs of the modeling filters (18), for measuring the intermodulation products of the adjusted modeling filters (18).

15   9.   The test arrangement as claimed in claim 8, wherein
the test circuit is followed by a calculation circuit (32) for calculating the multitone signal power ratio of the output signals which are
20   emitted from the modeling filter (18).

List of reference symbols

1	Signal generator
2	Output
3	Line
4	Branch node
5	Line
6	Input
7	Analog test circuit
8	Output
9	Line
10	Input
11	Subtraction circuit
12	Output
13	Line
14	Input
15	Adjustment circuit
16	Output
17	Adjustment lines
18	Modeling filter
19	Input
20	Line
21	Output
22	Line
23	Branch node
24	Line
25	Input
26	Line
27	Input
28	Measurement circuit
29	Output
30	Line
31	Input
32	Calculation circuit
33	Subtraction circuit
34	Overall circuit